## CLAIMS

1. A method for thermal insulation, characterized in that it comprises:

   - positioning a gel formed between an insulating liquid base, which may or may not be a phase change material, and at least one gelling agent comprising at least one polysiloxane resin, which may or may not be modified, and
   - in situ cross linking of said polysiloxane resin.

2. A method according to claim 1, characterized in that said insulating liquid base is selected from:

   - saturated or unsaturated, cyclic or non-cyclic aliphatic hydrocarbon bases;
   - aromatic hydrocarbon bases;
   - mixtures of aliphatic and aromatic fractions;
   - aliphatic and aromatic alcohols;
   - fatty acids, vegetable oils and animal oils; and
   - halogenated compounds.

3. A method according to claim 1 or claim 2, characterized in that said insulating liquid base is a phase change material.

4. A method according to claim 3, characterized in that said insulating liquid base is a $C_{12}$ to $C_{60}$ paraffinic cut.

5. A method according to claim 4, characterized in that said insulating liquid base is selected from long chain $C_{30}$ to $C_{40}$ n-paraffin waxes and long chain $C_{30}$ to $C_{40}$ isoparaffin waxes containing 1 or 2 branches.

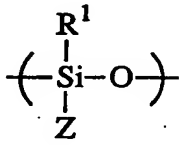
6. A method according to claim 3, characterized in that said insulating liquid base is selected from slightly branched alkyl chain alkylaromatics or alkylcycloalkanes, fatty alcohols and fatty acids.

7. A method according to claim 1 or claim 2, characterized in that said insulating liquid base is a kerosene.

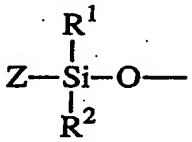
8. A method according to claims 1 to 7, characterized in that said polysiloxane resin is selected from:

- monomers containing a motif with formula (I) terminated by two motifs with formula (II);
- oligomers with unitary motifs with formula (I) terminated by motifs with formula (II);
- polymers comprising unitary motifs with formula (I) terminated by motifs with formula (II);
- cyclic oligomers comprising unitary motifs with formula (I); and
- cyclic polymers comprising unitary motifs with formula (I);

formulae (I) and (II) being shown below:



(I)



(II)

in which formulae:

- symbols $R^1$ and $R^2$, which are identical or different, each represent:
  - a linear or branched alkyl radical containing less than 30 carbon atoms, optionally substituted with at least one halogen;
  - a cycloalkyl radical containing 5 to 8 carbon atoms in the cycle, optionally substituted;
  - an aryl radical containing 6 to 12 carbon atoms, which may be substituted; or
  - any other alkylaromatic chain;

- symbols Z, which are identical or different, each represent:
    - a group $R^1$ and/or $R^2$;
    - a hydrogen radical;
    - a hydroxyl radical;
    - a vinyl radical (-CH=$CH_2$); or
    - a saturated or unsaturated, aliphatic or cyclic carbonaceous chain, which may or may not contain unsaturated bonds, which may or may not contain heteroatoms, which may or may not contain reactive chemical groups;

with at least one of symbols Z representing a cross-linkable group, using one of the cross-linking modes defined below.

9. A method according to one of claims 1 to 8, characterized in that said insulating liquid base represents 70% to 99.5% and said gelling agent represents 30% to 0.5% of the total weight of the mixture.

10. A method according to one of claims 1 to 9, characterized in that the mixture further comprises a compatiblizing agent between said insulating liquid base and said polysiloxane, the proportion of which is included in the proportion of gelling agent.

11. A method according to one of claims 1 to 10, characterized in that the gelling agent comprises at least one polyorganosiloxane terminated by hydroxyl functions and at least one silane containing alkoxy functions or carboxylate groups and cross-linking is carried out in the presence of an acid catalyst, a basic catalyst or a catalyst based on tin or titanium in the presence of traces of water acting as a co-catalyst.

12. A method according to one of claims 1 to 10, characterized in that the gelling agent comprises two functionalized polysiloxanes:

- a resin A containing vinylsilane functions (Si-CH=$CH_2$) which may be grafted;
- and a resin B containing hydrosilane functions (Si-H);

and in that cross-linking is carried out by hydrosilylation.

13. A method according to claim 12, characterized in that the proportions of resins A and B are such that the mole ratio between the hydrosilane groups from resin B and the vinylsilane groups from resin A is 0.8 to 1.4.

14. A method according to claim 12 or claim 13, characterized in that the mixture comprises a hydrosilylation catalyst.

15. A method according to one of claims 12 to 14, characterized in that said insulating liquid base generally represents 50% to 99.5% of the total mixture weight and the gelling agent represents 0.5% to 50%.

16. A method according to claim 15, characterized in that said insulating liquid base represents 70% to 98% and said gelling agent represents 2% to 30% of the total mass of the mixture.

17. A method according to one of claims 12 to 16, characterized in that the mixture further comprises a compatibilizing agent between said insulating liquid base and said polysiloxane, the proportion of which is included in the proportion of gelling agent.

18. A method according to one of claims 12 to 17, characterized in that said insulating liquid base is a $C_{12}$ to $C_{60}$ paraffinic cut, the proportion of gelling agent, which includes that of the compatibilizing agent, is 7% to 30% by weight, in which the compatibilizing agent represents a proportion of 10% to 40% by weight.

19. A method according to claim 18, characterized in that said insulating liquid base is a $C_{14}$ to $C_{20}$ paraffinic cut and the compatibilizing agent is octadec-1-ene.

20. A method according to one of claims 12 to 17, characterized in that said insulating liquid base is a kerosene and in that the gelling agent represents 5% to 30% by weight of the mixture.

21. A method according to one of claims 1 to 20, characterized in that the positioning time for said mixture is regulated by the temperature, the nature and the proportion of

resin in said mixture and by the nature and concentration of any catalyst in said mixture.

22. A method according to one of claims 1 to 21, characterized in that the mixture further comprises at least one additive selected from antioxidant additives, antibacterial agents, corrosion inhibitors, anti-foaming agents and colorants, which are soluble in the insulating liquid base.

23. A method according to one of claims 1 to 22, characterized in that the mixture further comprises at least one filler selected from hollow glass microbeads, fly ash, macrobeads and hollow fibres.

24. A method according to one of claims 1 to 23, characterized in that a flowline or a pipeline or a singularity on a flowline or pipeline is insulated.

25. A method according to claim 24, characterized in that an ultradeep pipeline is insulated for temperatures of 2°C to 200°C.

26. A method according to claim 24 or claim 25, characterized in that the mixture is applied as a coating to the flowline to be thermally insulated.

27. A method according to claim 24 or claim 25, characterized in that the mixture is interposed between the flowline and a protective external jacket.

28. A method according to claim 24 or claim 25, characterized in that said singularity consists of a bend, a tee, a valve or an automatic connector.

29. A method according to claim 28, characterized in that the singularity is on a flowline already in place on the seabed; a vacuum is created in said jacket to purge as much water as possible that it may contain; the mixture is injected into the jacket to inflate it and to create the desired insulation around said singularity.

30. A flowline or pipeline thermally insulated by a method according to one of claims 23 to 29.

31. A cross-linkable formulation for use in a method according to one of claims 1 to 29, characterized in that it comprises a mixture of an insulating liquid base, which may or may not be a phase change material, and at least one gelling agent comprising at least one polysiloxane, which may or may not be modified.

32. An insulating gel formulation according to claim 31, characterized in that the mixture further comprises a compatibilizing agent between said insulating liquid base and said polysiloxane.

33. An insulating gel formulation according to claim 31 or claim 32, characterized in that the gelling agent comprises two functionalized polysiloxane resins:

- a resin A containing vinylsilane functions ($Si\text{-}CH{=}CH_2$) which may be grafted;
- and a resin B containing hydrosilane functions (Si-H).

34. A process for producing an insulating gel from a formulation according to one of claims 31 to 33, characterized in that said formulation is subjected to cross-linking conditions.

35. A process according to claim 34, characterized in that in step a), a compatibilizing agent acting between said insulating liquid base and said polysiloxane is employed.

36. A process according to claim 34 or claim 35, characterized in that the gelling agent comprises two functionalized polysiloxanes:

- a resin A containing vinylsilane functions ($Si\text{-}CH{=}CH_2$) which may be grafted;
- and a resin B containing hydrosilane functions (Si-H);

and in that cross-linking is carried out by hydrosilylation.

37. An insulating gel, characterized in that it is formed from an insulating liquid base and at least one cross-linked polysiloxane resin.

38. An insulating gel, characterized in that it is obtained by a process according to one of claims 34 to 36.

39. A flowline or pipeline thermally insulated using a gel according to claim 37 or claim 38.

40. A flowline or pipeline according to claim 39, characterized in that said gel is applied to the flowline to be thermally insulated as a coating.

41. A flowline or pipeline according to claim 39, characterized in that said gel is interposed between the flowline and a protective external jacket.